

Abstract Submitted  
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**The shapes of the multiplicity distributions in  $\sqrt{s_{\text{NN}}}=7.7\text{--}200$  GeV Au+Au Collisions at STAR** DANIEL MCDONALD, Rice University, STAR COLLABORATION — A possible signature of the existence of a critical point in the phase diagram of nuclear matter is the non-monotonic behavior of the shapes of the multiplicity distributions of various groups of identified particles. These shapes are characterized by the variance and higher statistical moments, which may reflect the critical fluctuations that may diverge at beam energies near the critical point. The STAR experiment has measured Au+Au collisions at a wide range of beam energies,  $\sqrt{s_{\text{NN}}}=7.7\text{--}200$  GeV, and is well suited for numerous measurements because of its wide, uniform acceptance and the extended particle identification from a newly-installed Time-of-Flight (TOF) system. The measurements of the shapes of the multiplicity distributions of net protons and net charge, as well as total protons and total pions - via the intensive normalized cumulants of Ref. [1] and the moments products  $S\sigma$  and  $K\sigma^2$ - will be described.

[1] C. Athanasiou *et al.*, Phys. Rev. D 82, 074008 (2010). M. Stephanov, Phys. Rev. Lett. 107, 052301 (2011).

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